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HIGHLIGHTS

1. Hypertension Trends in Rwanda (2022–2023): Insights from STEPS and CRVS Data.
2. Hypertension Mortality Patterns (2023): Age, Gender, and Regional Disparities.
3. Malaria Among Under-Five Children and Pregnant Women (2014–2024): Incidence and Death Rate Trends.
4. Malaria Burden in Vulnerable Populations (2018–2022): Incidence, Mortality, and Geographic Distribution.

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General Information

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Its mission is to serve as a knowledge sharing platform for national and international public health scientific information. Content published under RPHB will be used to control and address potential public health outbreak threats and strengthen health systems through real time availability of information.

This will allow more and effective communication between policy makers, researchers and health practitioners.

A new issue is published quarterly with supplements and special reports. Publication materials are submitted online at https://www.rbc.gov.rw/publichealthbulletin/manuscripts/submission and should fulfil the RPHB's instructions.

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Contacts

Email: rwandapublichealtbulletin@gmail.com
Website: https://www.rbc.gov.rw/publichealthbulletin/

Address

Rwanda Public Health Bulletin Secretariat
KG 203St., City of Kigali, Rwanda

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Dear readers,

The Rwanda Public Health Bulletin (RPHB) continues to serve as a cornerstone for disseminating timely and actionable public health evidence to guide policy and strengthen health systems. This sixth volume, third issue, centered on the theme "Advancing Public Health Evidence for Action," reflects our ongoing commitment to transform surveillance data into knowledge that informs impactful decisions across Rwanda's health sector.

The featured analyses in this issue, spanning hypertension prevalence and mortality, malaria trends among children under 5, pregnant women, and insights from surveillance and health data systems, represent the outcomes of the April 2025 Data Analysis and Surveillance Report Writing Workshop. This workshop, organized by the Rwanda Biomedical Centre (RBC) through the Research, Innovation and Data Science (RIDS) Division in collaboration with the CDC Foundation and Bloomberg Philanthropies' Data for Health (D4H) Initiative Data Impact Program, was a practical exercise in strengthening the analytical and reporting capacity of our public health workforce to produce high-quality, evidence-based reports such as those published in this issue.

These reports illustrate how data from our health information and surveillance systems can be harmonized, analyzed, and translated into insights that improve policy, prevention, and resource allocation. They also demonstrate the power of collaboration between RBC, academic institutions, and international partners in building a sustainable culture of data use for health decision-making.

As we advance Rwanda's public health goals, the lessons and outputs from this workshop reinforce our collective vision: "a data-driven health system that continuously monitors progress, detects emerging threats early, and responds efficiently." The RBC remains committed to nurturing this culture of evidence generation and use, ensuring that every dataset serves a purpose and improving the health and well-being of every Rwandan.

I commend the authors, facilitators, and partners whose efforts have made this publication possible. Your dedication exemplifies the spirit of scientific excellence and collaboration that continues to move Rwanda toward a future where data truly drives health action.

Yours sincerely,



Prof. Claude Mambo Muvunyi, MD, PhD
Editor-In-Chief -The Rwanda Public Health Bulletin (RPHB)
Director General- The Rwanda Biomedical Centre (RBC)

Surveillance Report

Open Access

Hypertension Prevalence and Mortality in Rwanda (2022–2023): Insights from STEPS and CRVS Data

Josue Sencere Ukuri[1,*], Frederick Nsanzumuhire[1], Patrick Rukundo[1]

[1]*Rwanda Biomedical Centre (RBC), Ministry of Health, Kigali, Rwanda*

***Corresponding author:**
Josue Sencere Ukuri

NCDs Division, Rwanda Biomedical Centre (RBC), Ministry of Health, Kigali, Rwanda, Kigali, Rwanda

Email:ukuri13@gmail.com

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EXECUTIVE SUMMARY

Hypertension remains a public health challenge in Rwanda, contributing to preventable deaths from cardiovascular diseases. This report analyzes 2022-2023 data to identify trends and propose actionable solutions. Analysis of data revealed:

- Gender disparity persists, with women facing higher hypertension mortality (6.31/100,000) than men (4.98/100,000), likely due to biological risks and healthcare access barriers.
- District differences in prevalence and mortality rates demand attention, as Muhanga District records the highest prevalence (32%) while Nyarugenge has the highest mortality (13.1/100,000), reflecting uneven healthcare access and referral patterns.

The report highlights the need for enhanced public health interventions, including widespread screening, improved hypertension management, and education campaigns to raise awareness about lifestyle modifications. Recent progress offers hope, as Rwanda's Noncommunicable Diseases Strategic Plan (2020–2025) and Community Health Workers (CHWs) network provide a foundation for scalable interventions.

INTRODUCTION

Hypertension, commonly known as high blood pressure, is a major public health issue with an estimated 1.28 billion adults aged 30-79 years diagnosed with the condition worldwide [1,2]. It is a leading risk factor for cardiovascular diseases, stroke, kidney failure, and premature mortality. The prevalence of hypertension has been steadily increasing, largely due to changes in lifestyle, diet, and an aging population. According to the World Health Organization (WHO), hypertension affects 27% of the adult population in sub-Saharan Africa [2,3]. Rwanda is no exception.

Hypertension affects 16% of adults in Rwanda and adds to the growing burden of non-communicable diseases (NCDs), putting more pressure on the health system [4]. The condition often remains undiagnosed and untreated due to limited awareness and insufficient screening programs.

This report aims to present the current state of hypertension in Rwanda, and associated mortality. By understanding the factors contributing to the rise of hypertension in Rwanda, policymakers and healthcare providers can better design targeted interventions to reduce its mortality and impact on the health system.

METHODS

This study employed a dual-data approach to analyze hypertension in Rwanda. For prevalence

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data, we utilized the 2022 STEPwise approach to NCD risk factor surveillance (STEPS) Survey, a nationally representative study that implemented multi-stage cluster sampling across all districts [5]. The STEPs survey data incorporated population weights to ensure national representativeness. Trained personnel collected blood pressure measurements using standardized protocols with calibrated digital devices, with results expressed as percentages to align with WHO reporting standards for population surveys. The prevalence calculation followed the formula: (Number of hypertensive adults ÷ Total surveyed adults) × 100, with age-standardization using the WHO reference population.

Mortality analysis relied on the 2023 Civil Registration and Vital Statistics (CRVS) system, which aggregates death records from all health facilities nationwide. Hypertension-related deaths were identified using the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10 codes) (I10-I15) [6]. Mortality rates were calculated per 100,000 population using 2022 national census. The rate formula was: (Hypertension-attributed deaths ÷ Mid-year population) × 100,000.

Data processing involved rigorous cleaning in Microsoft Excel to address duplicates and outliers. Analytical procedures included descriptive statistics, and cases were stratified by gender, and district. Visualization tools (Python's Matplotlib/ Geopandas and Excel) generated district-level comparative charts.

The differing rate metrics (percentages for prevalence vs. per 100,000 for mortality) were intentionally selected to meet distinct analytical needs: percentages effectively communicate population burden, while standardized mortality rates enable precise tracking of relatively rare events and support cross-national benchmarking.

POPULATION DISEASE TRENDS

Analysis of the data indicates that hypertension-related mortality in Rwanda varies by gender. As shown in Table 1, the total number of deaths attributed to hypertension in 2023 was 750, with a mortality rate of 5.66 per 100,000 people. Males accounted for 320 deaths, with a mortality rate of 4.98 per 100,000, while females had a higher mortality rate of 6.31 per 100,000, with a total of 430 deaths.

Figure 1 provides a graphical representation of hypertension prevalence across the 30 districts in Rwanda. In 2022, Gatsibo district had the lowest prevalence rate (13%) while Muhanga district had the highest (32%), with the overall national prevalence rate being 16.2%.

Figure 2 illustrates hypertension-related mortality by province. Kigali City recorded the highest number of deaths attributed to hypertension, with a total mortality rate of 8.4 per 100,000 population. Females contributed a larger share, with a rate of 9.5 per 100,000. In contrast, the Eastern Province had the lowest mortality rate at 4.1 per 100,000, with males exhibiting a slightly higher death rate than females.

Figure 3 presents the hypertension mortality rate per 100,000 in Rwanda by district in 2023. Although Gatsibo district had the lowest prevalence of hypertension in 2022, Kirehe had the lowest mortality rate per 100,000 (2.4) in 2023. Although Nyarugenge district was below the national prevalence rate (12% vs. 16.2%) in 2022, it had the highest mortality rate (13.1) in 2023.

DISCUSSION

The findings of this report highlight gender disparities in hypertension-related mortality in Rwanda, with females exhibiting a higher mortality rate (6.31 per 100,000) compared to males (4.98 per 100,000). This finding aligns with global trends where women, particularly in low- and middle-income countries in Africa, often experience higher hypertension-related morbidity and mortality due to biological factors, healthcare

Table 1: *Hypertension-related mortality rates by gender in Rwanda, 2023.*

Gender	Population	Hypertension related deaths	Mortality rate per 100,000
Male	6,429,326	320	4.98
Female	6,817,068	430	6.31
Total	13,246,394	750	5.66

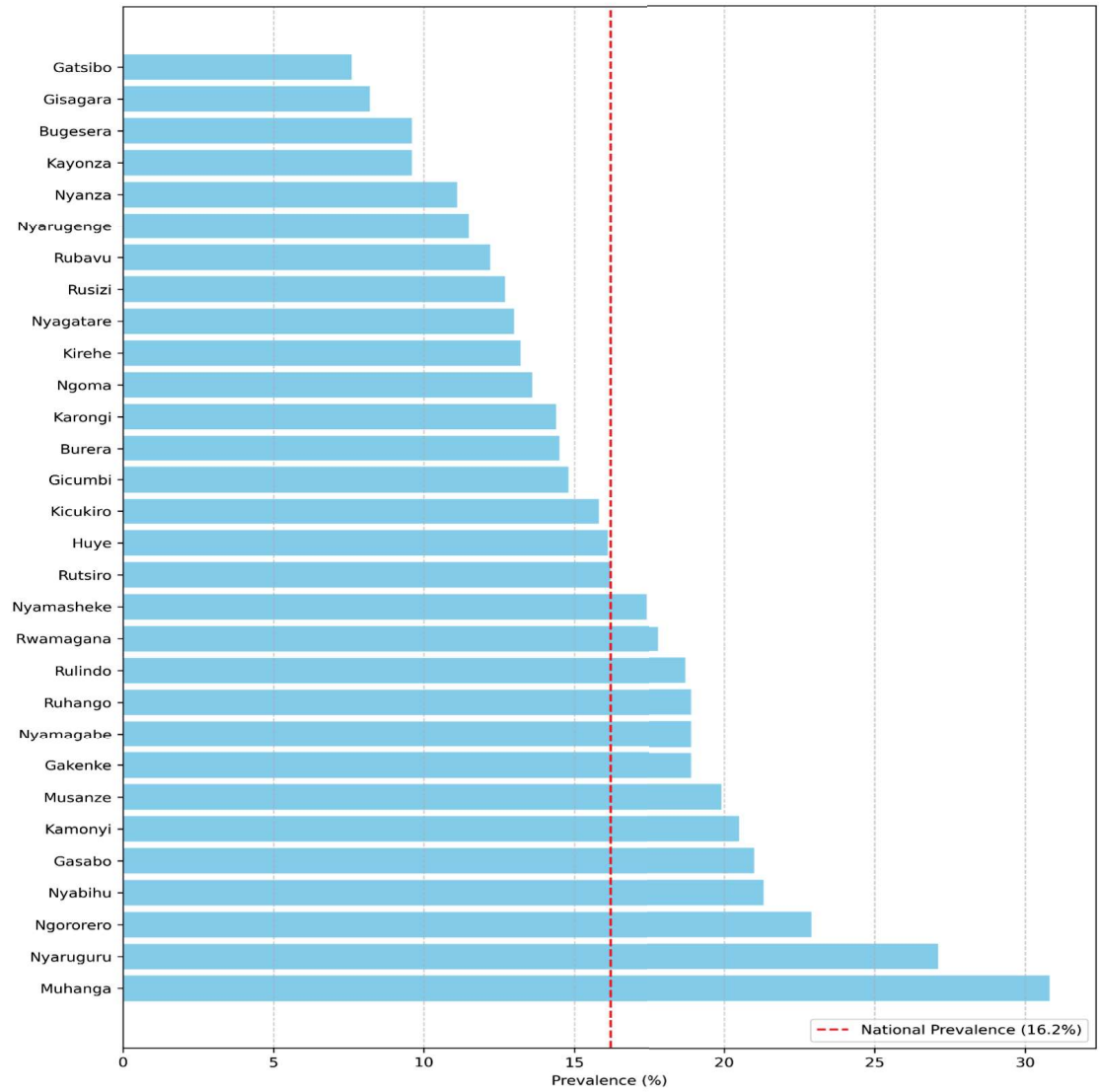


Figure 1: *Hypertension prevalence by district in Rwanda, 2022.*

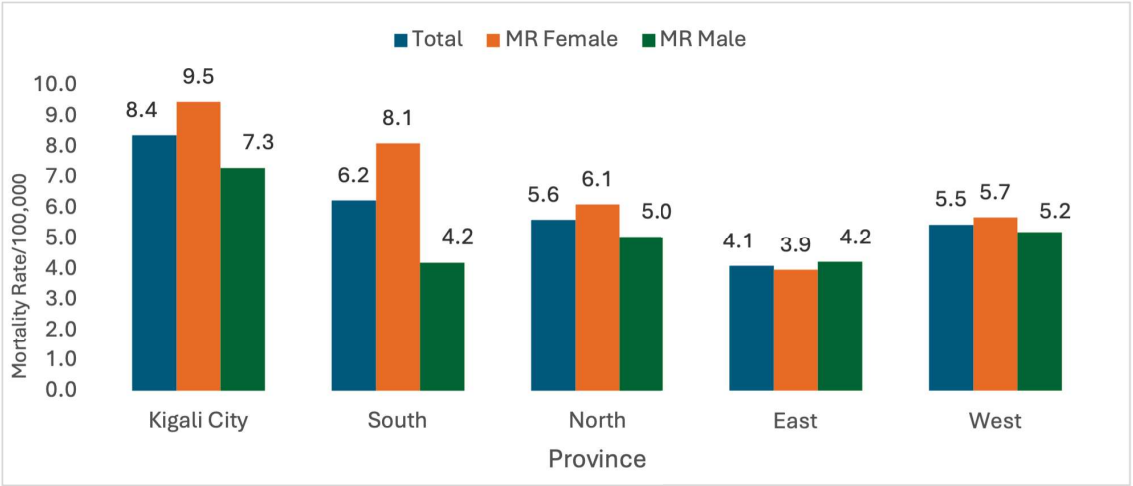


Figure 2: *Hypertension mortality rates by gender and provinces in Rwanda, 2023*

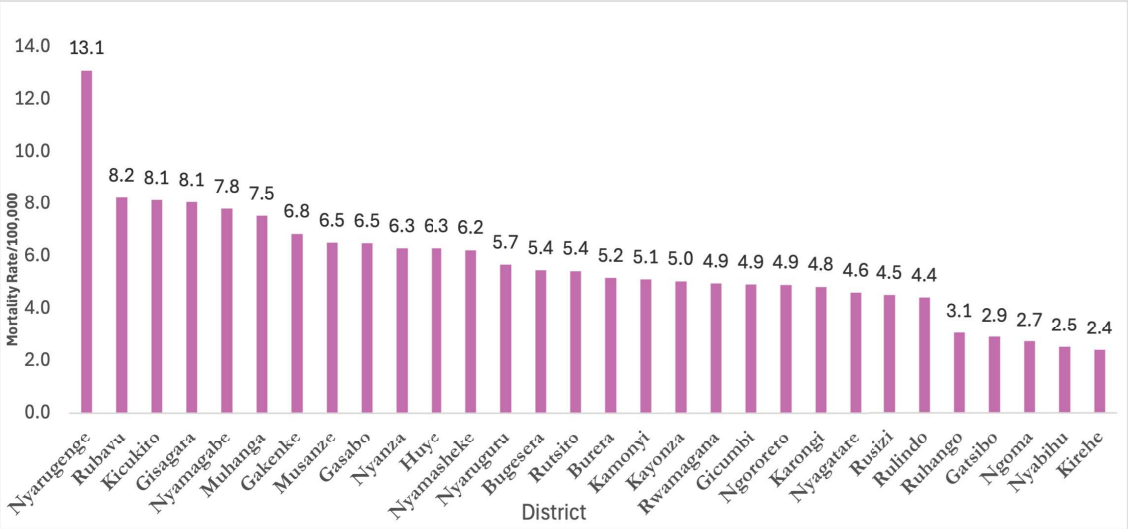


Figure 3: *Hypertension mortality rates per 100,000 people by district in Rwanda, 2023*

access disparities, and sociocultural barriers [7]. For instance, hormonal changes during menopause and pregnancy-related complications can exacerbate hypertension risks in women [8,9]. Additionally, cultural norms may delay women from seeking timely medical care, leading to advanced disease stages at diagnosis

The report also reveals district disparities, with Nyarugenge district recording the highest mortality rate (13.1 per 100,000) in 2023, while Muhanga had the highest prevalence (32%) in the 2022 STEPS survey [5]. This discrepancy can be attributed to differences in data collection methodologies used. The CRVS data, which tracks mortality, may reflect Nyarugenge's status as a hub for referral health facilities, including the University Teaching Hospital (one of the largest), where severe cases from other districts are often managed, thereby inflating mortality figures. In contrast, the STEPS survey, a population-based assessment, captures prevalence through community screenings, which may explain Muhanga's higher prevalence, possibly due to localized risk factors like diet or lifestyle [3]. Such methodological variations underscore the need for integrated data systems to harmonize findings for policy action.

Rwanda has made notable progress in addressing hypertension through policies like the Rwanda Non-Communicable Diseases (NCDs) Strategic Plan (2020–2025), which emphasizes community-based screenings and task-shifting to community health workers (CHWs) [10]. The integration of hypertension management into the national CHW program has improved early detection, particularly in rural areas [11]. However, challenges persist, including limited access to medications and diagnostic tools in peripheral facilities, which disproportionately affect women and rural populations [4].

Limitations: This study has some limitations. First, the reliance on CRVS data may underreport hypertension-related deaths due to misclassification or incomplete records, especially in rural areas. As of 2024, the CRVS completeness rate was 41%. Second, the STEPS survey's cross-sectional design limits causal inferences. Third, regional disparities in healthcare infrastructure, such as Nyarugenge's referral status, may skew mortality data. Finally, the analysis does not account for comorbidities like diabetes, which could influence mortality rates.

RECOMMENDATIONS

To effectively reduce hypertension-related mortality and prevalence in Rwanda, the following evidence-based and actionable recommendations are proposed: (1) the Rwanda Biomedical Centre should expand community-based hypertension screening through trained Community Health Workers, prioritizing high-burden districts like Muhanga and Nyarugenge while leveraging existing digital reporting tools; (2) the Ministry of Health must improve rural access to treatment by decentralizing antihypertensive medications

to health centers and training nurses to manage uncomplicated cases, supported by Rwanda's existing drug supply system; (3) targeted public awareness campaigns led by the Rwanda Broadcasting Agency and local leaders should promote salt reduction and regular blood pressure checks through radio, SMS, and community outreach programs; and finally (4) health facilities should integrate hypertension data into DHIS2 for real-time monitoring, while annual district audits and improved death reporting ensure accurate tracking of intervention outcomes.

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Surveillance Report

Open Access

Hypertension Mortality in Rwanda, 2023: Age, Gender, and Regional Disparities

Gad Nshimiyimana[1,*], Christian Ndinda[1], Joel Gasana[1], Gloriose Umuziranenge[2]

[1]*Rwanda Biomedical Centre (RBC), Ministry of Health, Kigali, Rwanda*
[2]*Protestant University of Rwanda Kigali, Rwanda*

EXECUTIVE SUMMARY

Hypertension is an escalating public health challenge in Rwanda, now contributing significantly to cardiovascular disease-related mortality. This report looks at national data from 2023 to assess the magnitude and distribution of hypertension-related deaths, focusing on age, gender, and disparities among districts.

- The findings reveal that Rwanda's overall hypertension mortality rate is 5.4 per 100,000, with women experiencing higher rates than men.
- Mortality rises significantly with age, reaching 97.2 per 100,000 among those aged 70 years and above, and is highest in urban areas like Kigali City and Nyarugenge District.
- Geographic and urban-rural disparities suggest lifestyle factors and reporting differences contribute to mortality variations, highlighting the need for targeted health interventions.

Hypertension-related mortality in Rwanda is marked by age, gender, and regional disparities. Addressing these disparities through targeted prevention, improved healthcare access, early detection, adequate management, and enhanced data systems is crucial to reducing premature deaths and improving population health.

***Corresponding author:**
Gad Nshimiyimana

NCDs Division, Rwanda Biomedical Centre (RBC), Ministry of Health, Kigali, Rwanda, Kigali, Rwanda

Email: gad.nshimiyimana@rbc.gov.rw

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INTRODUCTION

Hypertension remains a public health concern in Rwanda, contributing to a substantial portion of cardiovascular disease-related deaths [1,2]. The prevalence rate of hypertension in Rwanda has been increasing over the last decade, rising from 15,300 per 100,000 people in 2013 to 16,800 per 100,000 people in 2022 [3,4]. This further strains the health system, already burdened by infectious diseases [5]. Understanding the magnitude and distribution of hypertension-related mortality is crucial for developing targeted interventions and policies aimed at reducing premature mortality [6]. This report aims to assess the magnitude and distribution of hypertension-related mortality in Rwanda by examining mortality disparities across age groups, genders, and geographic regions.

METHODS

We reviewed all hypertension-related mortality data from the Health Management Information System (HMIS) collected in 2023.
The HMIS, based on the District Health Information Software 2 (DHIS2) platform [7],

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captures health data from all public and many private facilities, including health posts, health centers, and hospitals. It also integrates data entered by community health workers (CHWs) through mobile tools or paper forms. HMIS is linked with other systems like electronic Logistics Management Information System (eLMIS), Rapid Short Message Service (RapidSMS), and Electronic Medical Records (EMRs). Data from HMIS enable evidence-based decision-making and support efficient health systems management across Rwanda's healthcare network.

A death was determined as hypertension-related from the Medical Certification of Cause of Death (MCCOD) completed at health facilities and reported to the HMIS in 2023. The hypertension-related mortality rate is calculated by dividing the number of deaths by the total population for each demographic category. Mortality rates are expressed per 100,000 people. Analysis explored differences in mortality rates by age, gender, and district of residence. Age was categorized into four groups: under 35, 35-49, 50-69, and 70 years or older. Gender was categorized as male or female.

POPULATION DISEASE TRENDS

Table 1 shows that the mortality rate is higher for females than for males, at 6.0 and 4.8 per 100,000, respectively. The overall mortality related to hypertension is 5.4 per 100,000 people.

Figure 1 shows that hypertension-related mortality increases with age, peaking among individuals aged 70 and above, where women have higher rates (105.0/100,000) than men (84.3/100,000). Mortality is low in those under 35, but between ages 35–69, men exhibit higher rates (11.4/100,000)

Table 1: *Hypertension mortality rate by Gender per 100,000 people*

	Population	Number of Deaths	Rate per 100,000 population
Male	6,728,476	320	4.8
Female	7,134,259	430	6.0
Overall	13,862,735	750	5.4

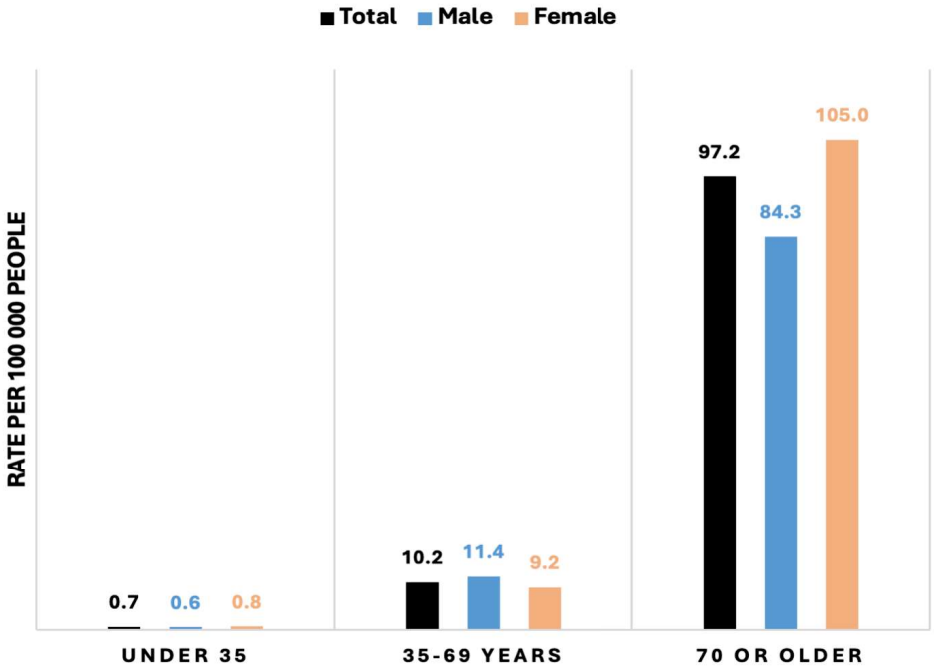


Figure 1: *Hypertension-related mortality rate (per 100,000 people) by age and sex, 2023*

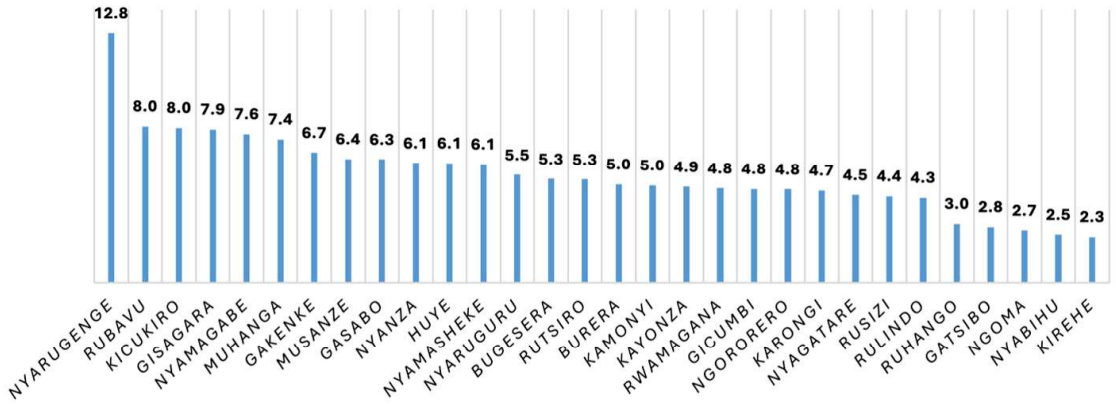


Figure 1: *Hypertension mortality rate (per 100,000 people) by district in Rwanda, 2023*

than women (9.2/100,000). Figure 2 indicates disparities in mortality rates across Rwandan districts. Nyarugenge has the highest mortality rate (12.8%), followed by Rubavu, Kicukiro, and Gisagara, all with a mortality rate of around 8.0. Kirehe has the lowest rate (2.3%), followed by Nyabihu, Ngoma, Gatsibo, and Ruhango, all ranging between 2.5% and 3.0%.

DISCUSSION

The results indicate significant disparities in hypertension-related mortality across districts and age groups. Mortality is highest in Kigali City (8.2%), particularly in Nyarugenge (12.8%), likely due to urban lifestyle factors such as poor diet, stress, and limited physical activity [6]. In contrast, rural areas like Kirehe (2.3%) exhibit lower mortality, possibly due to healthier living conditions in the countryside [5]. Age is a major determinant, with 97.2 deaths occurring in individuals 70 or older, who have the highest mortality rate of 97.2 per 100,000 people, while younger age groups experience minimal impact. The association with age can be explained by the physiological changes and cumulative effects of elevated blood pressure on cardiovascular organs [8].

The observed gender differences in hypertension-related mortality rates are influenced by both behavioral and biological factors. Middle-aged men tend to have higher exposure to risk factors like tobacco use, alcohol, and poor health-seeking behavior, which worsen hypertension outcomes [9,10]. In contrast, older women's higher mortality may be linked to post-menopausal hormonal changes that increase cardiovascular risk, and potential differences in healthcare access [11].

The findings highlight the need for targeted interventions, especially for older adults and urban populations, focusing on hypertension management, lifestyle education, and improved healthcare access to reduce premature mortality [12].

Limitations: The Civil Registration and Vital Statistics (CRVS) system is more developed in Kigali than in rural areas. Rural deaths may lack proper MCCOD, which could lead to potential underreporting and misclassification of mortality causes.

RECOMMENDATIONS

The Ministry of Health and its agencies should strengthen hypertension prevention and awareness by conducting campaigns that promote healthy lifestyles, including low-salt diets, regular exercise, and stress management. It is also recommended that campaigns be implemented on the risks of hypertension and the importance of routine blood pressure checks by local CHWs or by visiting the nearest health post or health center where routine blood pressure checks are available. For further assessment and treatment, people are referred to district hospitals. In addition, the Rwanda Biomedical Centre (RBC) and the Ministry of Health regularly organize outreach campaigns where free blood pressure checks are offered. Many private clinics and pharmacies also provide

accessible blood pressure checks, especially in urban areas.

Additionally, it is advised to enhance blood pressure check services to ensure early diagnosis for timely management, starting in areas with the highest mortality burden. These services can be integrated into routine care at all health facilities, expanding community-based checking through trained CHWs, organizing outreach campaigns in high-burden districts, partnering with private clinics and pharmacies, and using digital health tools to improve tracking and follow-up.

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Surveillance Report

Open Access

Malaria incidence and death rates among under-five children (2014-2024) and pregnant women (2018-2023) in Rwanda

Theogene Kubahoniyesu[1,2,*], Gregorie Muhorakeye[1], Apolline Kampire[3], Faustin Kanyabwisha[4]

[1]*Research, Innovation and Data Science Division, Rwanda Biomedical Centre, Kigali, Rwanda*
[2]*African Center of Excellence in Data Science, University of Rwanda, Kigali, Rwanda*
[3]*College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda*
[4]*Rwanda Military Referral and Teaching Hospital, Kigali, Rwanda*

EXECUTIVE SUMMARY

Malaria continues to pose a public health threat to under-five children and pregnant women in Rwanda, despite progress in reducing cases through strategies like insecticide-treated nets and prompt treatment. This report presents an analysis of malaria surveillance data from 2014 to 2024.

- Malaria incidence among under-five children was consistently highest in Eastern and Southern districts, particularly Kayonza, Ngoma, Gisagara, and Ruhango, likely due to environmental conditions and socio-economic vulnerabilities.
- The burden of severe malaria (characterized by organ failure and metabolic abnormalities) and malaria-related deaths peaked in 2016. However, following the scale-up of interventions such as the distribution of long-lasting insecticidal nets (LLINs), indoor residual spraying (IRS), and community-based fever management, cases and deaths declined significantly. By 2023, under-five malaria incidence dropped from 345 cases (2018) to 40 cases (2023) per 1,000 population representing an 88% reduction.
- Among pregnant women, malaria incidence was highest in 2018, especially in the Eastern Province but fell to fewer than 10 cases per 1,000 by 2023, reflecting the successful integration of intermittent preventive treatment in pregnancy (IPTp) within routine antenatal care services.
- Despite national gains, disparities persist at the subnational level. Some districts continue to report higher incidence of morbidity and mortality than others among children under five, which has not declined at the national rate, suggesting possible gaps in severe case management and access to timely treatment.

Rwanda's comprehensive response, particularly the 2016 Malaria Contingency Plan, has yielded clear benefits. Sustained progress will depend on intensified efforts in high-burden districts, continuous LLIN and IPTp coverage, improved case management, and a deeper investigation of environmental drivers, including irrigation systems and climate variability.

***Corresponding author:**
Theogene Kubahoniyesu

Research, Innovation and Data Science Division, Rwanda Biomedical Centre, Kigali, Rwanda

Email: theogenek9@gmail.com

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INTRODUCTION

Globally, the World Health Organization (WHO) reported 263 million cases in 2023, an increase of 11 million when compared to cases in 2022. Additionally, the WHO estimated 597,000 malaria deaths in 2023, a decrease of 3,000 when compared to deaths in 2022 [1]. In 2023, 94% of global cases and 95% of global deaths were from the Sub-Saharan African region (SSA). Of those deaths, 76% were observed in children under five [2]. Malaria affects 13.3 million pregnant women in SSA annually and is responsible for 10,000 maternal deaths worldwide [3]. Rwanda is targeting the elimination of malaria by 2030, and is implementing community interventions, including distribution of long-lasting insecticide nets (LLINs), indoor residual spraying (IRS), and early diagnosis to control malaria [4,5]. The interventions decreased malaria cases from 345 per 1,000 in 2018 to 40 per 1,000 in 2023 [6]. Children under five years old and pregnant women are still the most vulnerable populations in Rwanda. The most affected area is the Eastern region, followed by the southern part of the country [7].

This surveillance report presents the patterns and trends of malaria cases among children under five years (2014-2024) and pregnant women from 2018 to 2023. This report provides insights to improve interventions to achieve the country's target of zero malaria cases by 2030.

METHODS

This was a retrospective analysis of malaria surveillance data from 2014 to 2024, focusing on children under five years and pregnant women in Rwanda. Data were sourced from the District Health Management Information System (DHMIS). Variables include demographic data, case numbers, deaths, and severity of malaria (characterized by organ failure and metabolic abnormalities). For consistency and completeness, data were cleaned before analysis. The population was calculated using 2022 census data. According to the 2022 census, 1,708,460 children are under five years old, and 3,445,665 women are of reproductive age [8]. Descriptive statistics using Excel were employed to calculate malaria prevalence and death rates by district, and year to identify trends over the decade.

Severe malaria: In this report, severe malaria refers to malaria cases in under-five children or pregnant women that progress to life-threatening conditions as defined by the World Health Organization (WHO). These include clinical or laboratory evidence of complications such as cerebral malaria, severe anemia (Hb <5 g/dL), respiratory distress, metabolic acidosis, hypoglycemia, shock, acute kidney injury, jaundice, or multi-organ failure.

Malaria-related death: A malaria-related death is defined as the death of a child under five or a pregnant woman with confirmed malaria (by rapid diagnostic test or microscopy) where malaria was the direct or underlying cause of death.

POPULATION DISEASE TRENDS

Malaria incidence rate in Rwanda: The map (Figure 1) presents malaria incidence rates per 100,000 population across Rwanda's districts from 2014 to 2024, calculated as the average per district in the study period. The highest burden is observed in the eastern and southeastern districts of Ngoma (262 per 100,000), Kayonza (243 per 100,000), and Ruhango (164 per 100,000), indicating concentrated transmission in these areas. In contrast, several northern and western districts, including Musanze, Nyabihu, and Burera, reported incidence rates below 2 per 100,000, reflecting effective control efforts or lower transmission risk.

Severe malaria cases and malaria-related deaths among under-five children: Figure 2 illustrates the trends in both severe malaria incidence and malaria-related death rates among under-five children in Rwanda from 2014 to 2024. The severity rate peaked in 2016 at nearly 391 cases per 100,000 children before steadily declining to under 40 by 2024. Similarly, the death rate decreased from 9.3 per 100,000 in 2014 to just 0.2 by 2024, reflecting improvements in early diagnosis, access to treatment, and overall child health services. The concurrent downward trends in both indicators demonstrate the effectiveness of Rwanda's integrated malaria control strategies over the past decade.

Malaria incidence rate and trend among pregnant women in Rwanda (2018-2023): Figure 3 is a heatmap that illustrates malaria incidence rates among pregnant women across Rwandan districts from 2018 to 2023, expressed

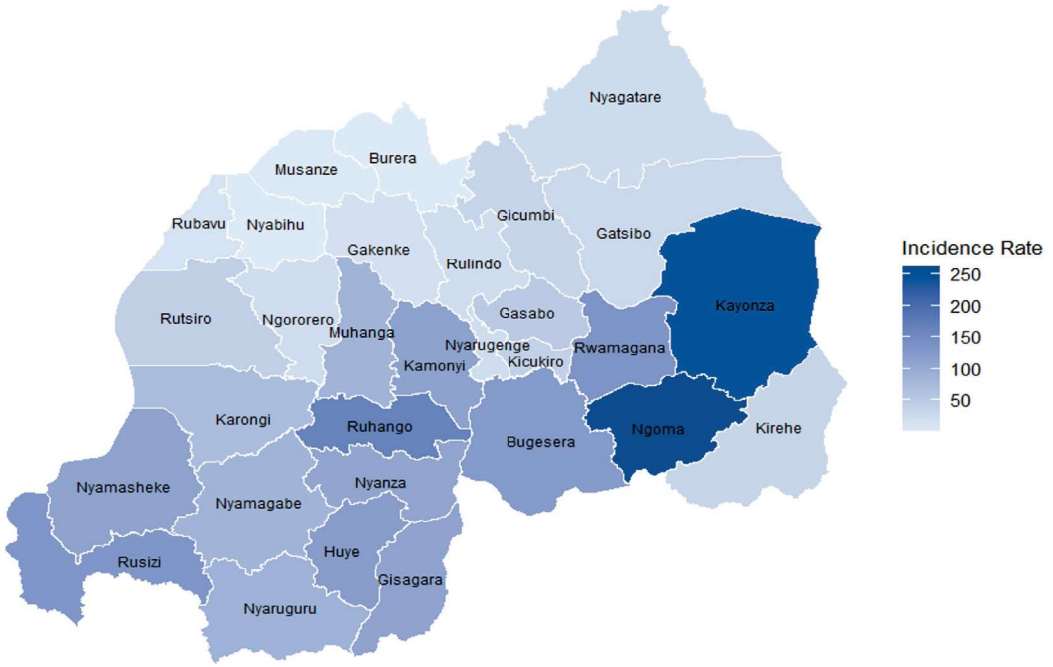


Figure 1: *Average incidence rate (per 100,000) of malaria cases among children under five years per district in Rwanda (2014-2024)*

per 100,000 women of reproductive age. In 2018, several districts such as Kayonza (99 per 100,000), Rwamagana (73 per 100,000), and Rusizi (56 per 100,000) reported comparably high incidence rates. By 2020, incidence rates in nearly all districts dropped below 50 per 100,000, with Ngoma, Gatsibo, Musanze, and Nyaruguru approaching or reaching zero. Nonetheless, districts such as Nyarugenge and Gasabo maintained comparably higher incidence in 2023.

The national average malaria incidence rate among pregnant women in Rwanda showed a consistent and sharp decline from 2018 to 2023.

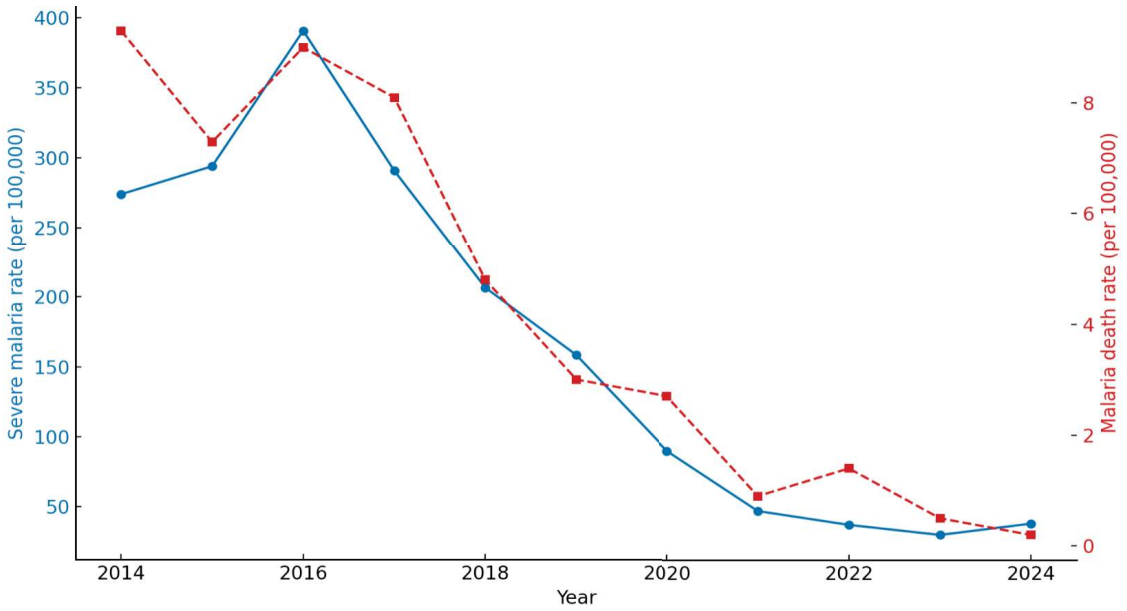


Figure 2: *Trends in Severe Malaria Cases and Malaria–related deaths Among Under-Five Children in Rwanda (2014–2024).*
Severe malaria: Life-threatening malaria with complications (e.g., severe anemia, cerebral malaria, respiratory distress, hypoglycemia, shock, kidney injury, jaundice, multi-organ failure). In DHMIS, it is flagged when organ failure or metabolic abnormalities are reported.

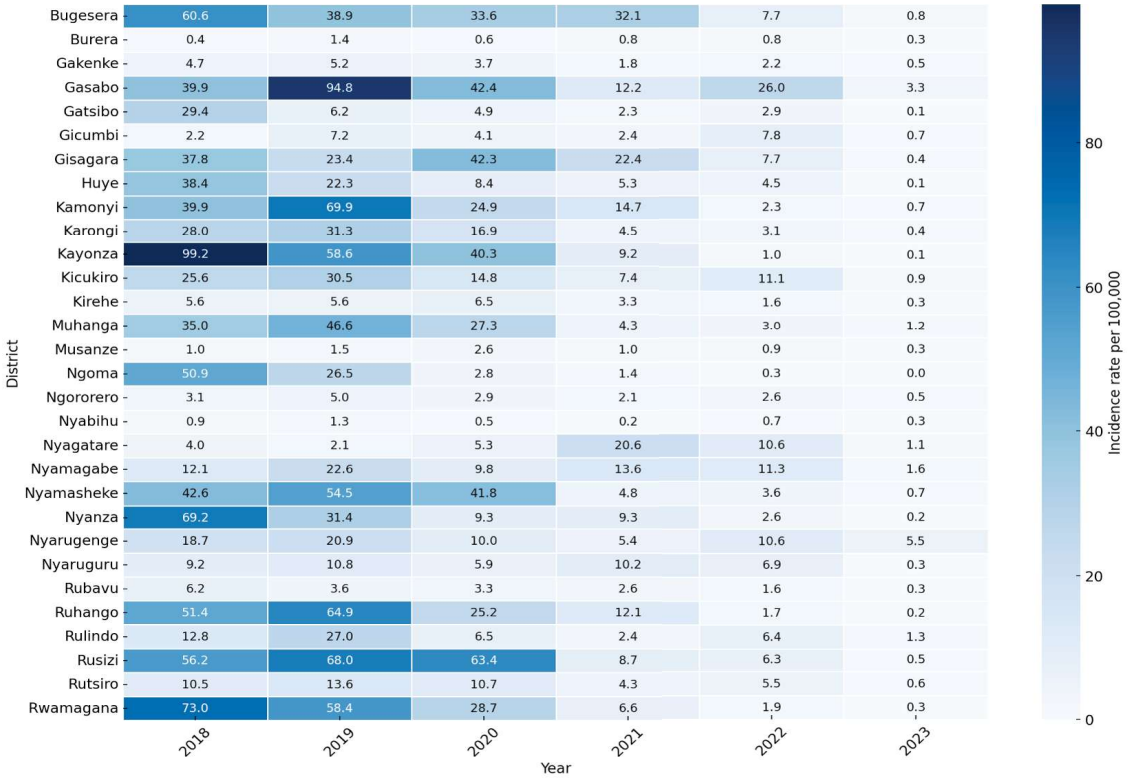


Figure 3: *Incidence cases of malaria among pregnant women in Rwanda (2018-2023)*

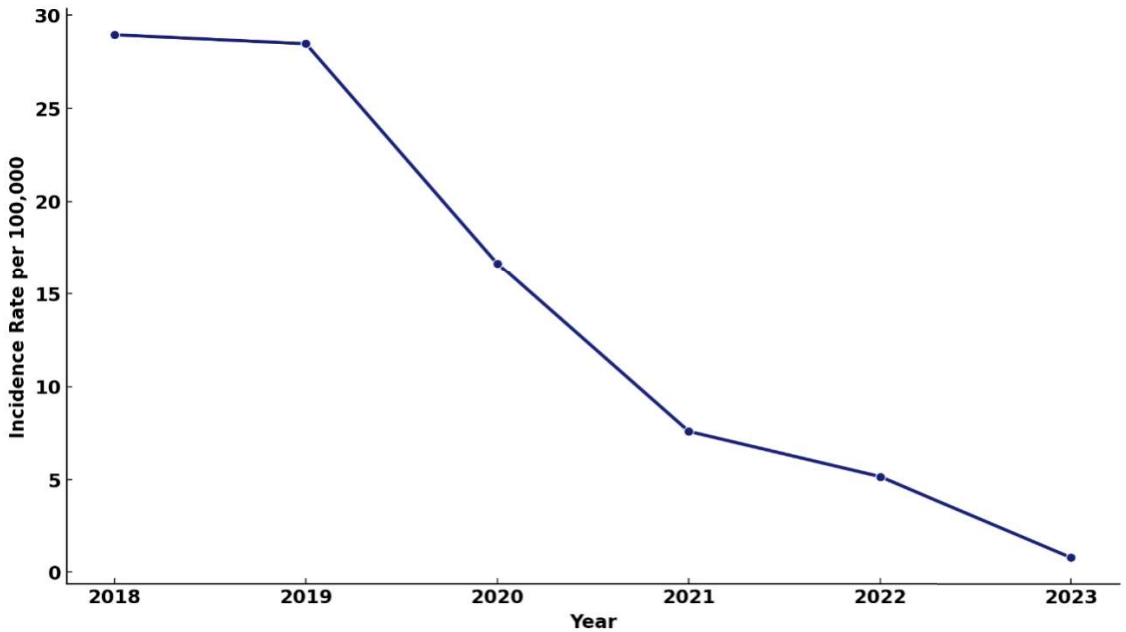


Figure 4: *Incidence rate of malaria cases among pregnant women in Rwanda (2018-2023)*

DISCUSSION

The observed decline in malaria cases and deaths among under-five children and pregnant women in Rwanda from 2014 to 2024 reflects the success of the country's targeted interventions. However, the persistence of regional disparities warrants enhanced interventions.

The results for children under five years demonstrate substantial progress in malaria control in Rwanda between 2014 and 2024. Malaria incidence in this group was initially highest in the Eastern and Southern districts, with severe malaria cases peaking in 2016 at nearly 391 per 100,000.

The higher incidence rates among under-five children in the eastern and southern districts, such as Kayonza and Gisagara, suggest underlying factors that require further investigation and targeted interventions. These districts are mostly rural and may be more prone to malaria than urban areas due to a combination of factors related to the environment, socioeconomic conditions, and access to healthcare [11]. While national-level progress is evident, regional disparities necessitate a localized approach to malaria control. The persistent number of deaths among under-five children, despite the decrease in the number of malaria cases, emphasizes the need for continued vigilance and enhancement of existing control measures to prevent any resurgence. Additionally, disparities in healthcare access and income levels could contribute to these regional differences, as is the case in other SSA countries [2].

The observed decline in malaria cases among pregnant women in Rwanda, from high rates in 2018-2019 to significantly lower levels by 2022-2023, underscores the effectiveness of implemented malaria control strategies. This downward trend highlights the cumulative impact of strengthened malaria prevention and control efforts, including improved antenatal care services, widespread distribution of insecticide-treated nets, and increased community awareness. The progressive reduction reflects a successful public health response and signals ongoing progress toward malaria elimination among high-risk populations. Similarly, the sustained reduction in malaria-related mortality among under-five children over the past decade indicates the success of interventions such as improved treatment access, ITN usage, IRS, and community-based strategies including drone delivery of medicines and household surveillance to identify and treat index cases [5,9]. Rwanda's subsequent decline in cases can be attributed to the implementation of the 2016 Malaria Contingency Plan, which emphasized community-based fever management, widespread distribution of Long-Lasting Insecticide-Treated Nets (LLINs), and IRS [4,5]. These interventions are consistent with WHO recommendations, which highlight LLINs and IRS as cornerstones of malaria control in high-burden regions [10].

The sharp decline in malaria cases among pregnant women after 2019 mirrors the findings from other SSA countries that scaled up IPTp and antenatal care [12]. Rwanda's integration of IPTp into maternal health services likely played a critical role.

Rwanda's overall success in reducing malaria cases aligns with global trends, where intensified control measures have led to declines in morbidity and mortality [10]. However, the country's progress surpasses that of many SSA nations, where stagnation or resurgence has been reported due to insecticide resistance and funding gaps [10]. For instance, while Rwanda achieved a 90% reduction in cases by 2023, neighboring countries like Tanzania reported slower progress (55% reduction) [13,14,15].

Limitations: While this report provides valuable insights, some limitations should be acknowledged. Reliance on DHMIS data may introduce reporting biases, as underreporting is common in resource-limited settings. We could not include environmental (e.g., rainfall, land use) and socio-economic (e.g., household income, education) data, which limits the ability to fully explain regional disparities. Finally, the lack of data on malaria-related maternal deaths prevents a comprehensive assessment of the disease's impact on pregnant women.

RECOMMENDATIONS

The Ministry of Health (MoH) is recommended to maintain and reinforce successful strategies that reduced malaria cases and deaths (prompt access to treatment, ITN use, IRS, breeding ground destruction, and epidemic response). The MoH also should maintain a focus on pregnant women and children under five years through integration of malaria prevention into maternal, newborn, and child health services. The Rwanda Biomedical Centre (RBC) needs to keep prioritizing and strengthening malaria control interventions in high-burden districts (Kayonza, Ngoma, Ruhango, Rusizi, Gisagara), accounting for environmental and population risk factors. It has also to strengthen and expand community-based strategies, including Community Health Workers (CHWs)-led fever management and household surveillance, to

reduce severe malaria among children under five. District health facilities and local governments should implement targeted malaria control actions in high-incidence districts, adapt interventions to local environmental and socio-economic conditions, and mobilize communities to sustain LLIN usage, IRS acceptance, and environmental management. The CHWs would support early diagnosis and treatment of fever cases at the community level, and promote consistent ITN use, IPTp uptake during pregnancy, and timely care-seeking behaviors.

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Surveillance Report

Open Access

Malaria Burden Among Vulnerable Populations in Rwanda, 2018–2022: Trends in Incidence, Mortality, and Geographic Distribution

Christian Nsanzabaganwa[1,*], Anastase Muhashyi[1], Jeanne d'Arc Nyinawankusi[1], Tuyishimire Moise[1], Marie Claire Dusengiyera[1], Kimberly Koporc[2], Edwin Masese Machie[2], Andrew Ancharski[2]

[1]*Rwanda Biomedical Centre, Kigali, Rwanda*
[2]*CDC Foundation, Atlanta, USA*

***Corresponding author:**
Dr. Christian Nsanzabaganwa

Research Innovation and Data Science Division, Rwanda Biomedical Centre, Kigali, Rwanda

Email: nsanzechriss@gmail.com

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EXECUTIVE SUMMARY

Malaria control is a priority for the Ministry of Health in Rwanda, which is implementing community interventions, including distribution of long-lasting insecticide nets (LLINs), indoor residual spraying (IRS), and early diagnosis to control malaria. As the number of overall cases decreases, the focus on special populations is key to further reducing the number of cases and deaths. Special populations include children under five years, pregnant women, and the elderly. This report uses surveillance and mortality data of 5 years (2018-2022) to identify priorities for interventions. Key findings are presented below.

- The Southern districts recorded higher incidence rates among children under five years of age of over 400 cases per 10,000 persons.
- Medical facilities reported decreasing deaths in both genders and all age groups in the last 5 years (2018-2022)
- Women were diagnosed with malaria in medical facilities half as frequently as men.
- People over the age of 65 years account for 21% of the deaths due to malaria, while representing only 3% of the population

Rwanda's continued decline in malaria cases and deaths between 2018 and 2022 demonstrates the effectiveness of sustained national control efforts, including LLIN distribution, IRS, and community-based interventions. However, persistent regional disparities (particularly in the southern districts and areas around Kigali) and the disproportionate mortality among the elderly underscore the need for more targeted and equitable approaches. Strengthening data systems, refining intervention coverage, and addressing gender and age-specific vulnerabilities will be key to accelerating progress toward malaria elimination and safeguarding gains achieved so far.

INTRODUCTION

Malaria is a vector-borne parasitic disease caused by the protozoan parasites of the genus Plasmodium. It is considered a major public health problem with high morbidity and mortality [1]. According to the World Health Organization (WHO) report of 2022, there are over 240 million annual cases of malaria with over 500,000 deaths. Children under 5 years of age are most at risk for

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severe disease and death. Malaria is endemic in 85 countries. However, 95% of the malaria cases occur in the WHO African Region [2].

In Fiscal Year (FY) 2022-2023, Rwanda saw progress in malaria control. Malaria incidence dropped by 38%, from 76 to 47 per 1,000 people. The Slide Positivity Rate decreased from 22% in FY 2021-2022 to 14% in FY 2022-2023. Uncomplicated malaria cases declined by 38%, with 58% managed at the community level. Severe cases fell by 28%, from 1,831 to 1,316. Malaria-related deaths also dropped by 28%, from 71 to 51 [3]. These reductions reflect the country's strengthened efforts in malaria prevention and management. Rwanda has made significant strides in controlling the disease through implementation of various control interventions including: mass and routine distribution of long-lasting insecticide nets (LLINs), indoor residual spraying (IRS) in high endemic districts, adoption of mandatory laboratory confirmation prior to the treatment, use of Artemisinin-Based Combination Therapies (ACTs) in the treatment of uncomplicated malaria cases, national scale up of community based management and improvement in routine surveillance, and monitoring and evaluation platforms [3], [4].

This report focuses on the most at-risk populations for malaria with a focus on children under 5, and the elderly in Rwanda. Rwanda currently has 1,708,460 children under 5 years old, all of which are considered at risk for malaria. The report aims to relay information on current trends and identify areas for intervention for malaria.

METHODS

A retrospective descriptive epidemiological analysis was conducted using routine malaria surveillance and mortality data from health facilities across Rwanda for the period 2018–2022. Data were analyzed to assess temporal trends, demographic distribution, and geographic patterns of malaria among special populations, including children under five years, pregnant women, and the elderly. Descriptive statistics were generated to calculate incidence and mortality rates by age, gender, and region. Trends were visualized through charts and maps to identify high-burden areas and population subgroups at elevated risk. All analyses, data aggregation, and visualizations were performed using Microsoft Excel.

POPULATION DISEASE TRENDS

Cases

Malaria decreased in all regions during the last 5

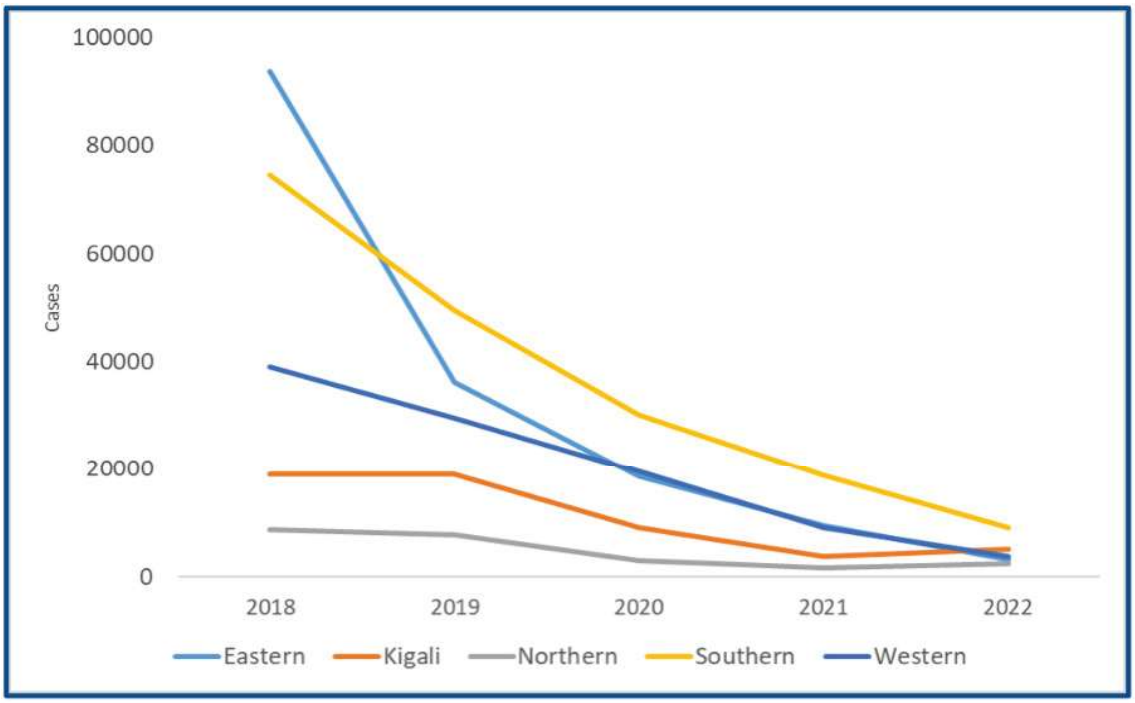


Figure 1: *Rwanda malaria cases under 5 years of age by region from 2018-2022*

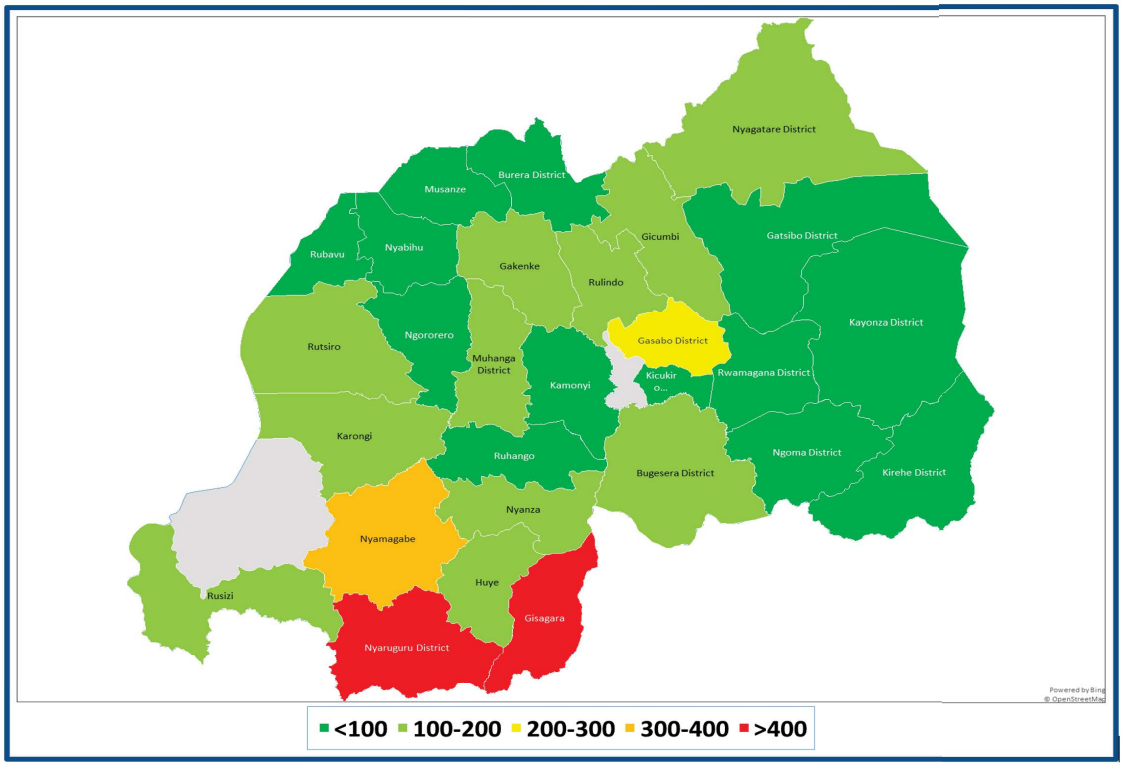


Figure 1: *Rwanda 2022 malaria infection rate per 10,000 children under 5.*

years of complete data (2018-2022) across all age groups, including children under 5. In 2022 there were 23,551 among children under 5, a decrease of 45% from 2021 (42,803 cases in 2021). The largest decreases in overall case numbers were coming from the Southern and Northern regions (Figure 1). The Southern region of Rwanda and areas around Kigali compared to other regions of the country reported the highest number of cases of Malaria in children under 5 years of age (Figure 2).

Figure 3 shows the year-to-year percentage change in malaria infection rates among children under five across Rwanda's districts. Between 2021 and 2022, malaria rates among children

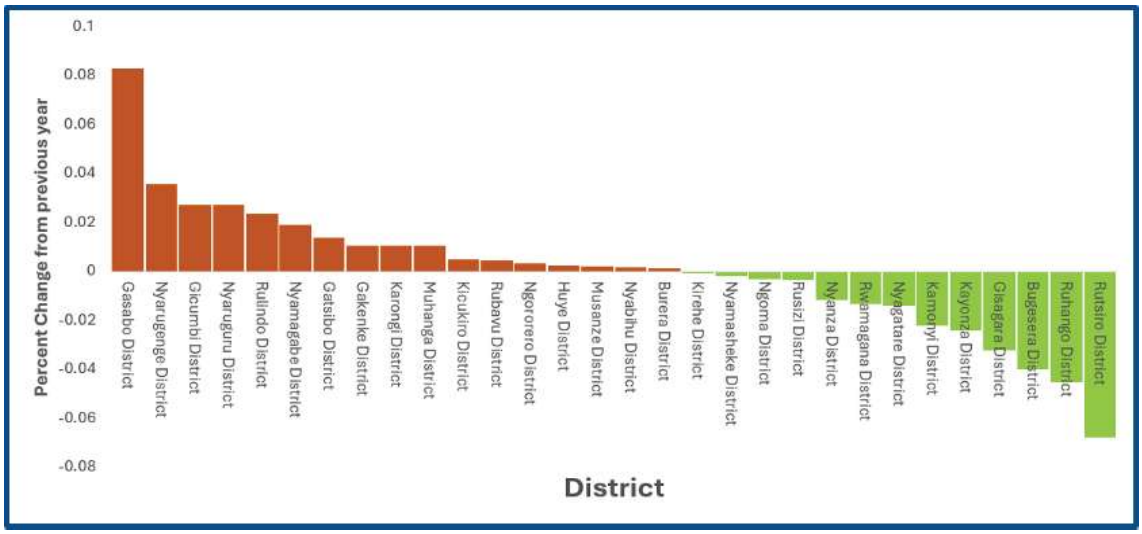


Figure 3: *Rwanda malaria under 5 rate change by district 2022 vs 2021*

Figure 3: *Incidence cases of malaria among pregnant women in Rwanda (2018-2023)*

Region	Eastern	Southern	Western	Northern	Kigali	Unknown	Total
Gender							
Female	15 (0.51)	17 (0.42)	16 (0.57)	4 (0.25)	7 (0.39)	1 (0.25)	60 (0.44)
Male	14 (0.49)	24 (0.58)	12 (0.43)	12 (0.75)	11 (0.61)	3 (0.75)	76 (0.56)
Age							
Under 5	10 (0.345)	9 (0.22)	8 (0.29)	4 (0.25)	3 (0.17)	2 (0.5)	36 (0.26)
5–14	3 (0.10)	7 (0.17)	5 (0.18)	4 (0.25)	0 (0)	1 (0.25)	20 (0.15)
15–49	4 (0.14)	9 (0.22)	5 (0.18)	6 (0.375)	10 (0.555)	1 (0.25)	35 (0.25)
50–64	2 (0.07)	9 (0.22)	1 (0.03)	0 (0)	4 (0.22)	0 (0)	16 (0.12)
65 and over	10 (0.345)	7 (0.17)	9 (0.32)	2 (0.125)	1 (0.055)	0 (0)	29 (0.22)
Total	29 (0.22)	41 (0.30)	28 (0.21)	16 (0.12)	18 (0.13)	4 (0.03)	136 (1)

under five showed heterogeneous trends across Rwanda's districts. Notably, Gasabo, Nyarugenge, and Gicumbi recorded increases, while Ruhango, Bugesera, and Gisagara experienced declines.

Mortality

In 2023, Rwanda recorded 136 malaria deaths across all districts with 36 of those being in children under 5 years of age (26% of total cases). People over 65 years of age also account for 29 reported deaths in Rwanda (22% of total cases) (Table 1).

Though malaria mortality in all age groups was decreasing, Figure 4 highlights a discrepancy in deaths reported at facilities by gender, where of the 136 malaria deaths reported, 76 were male (56%) and 60 were female (44%), compared to the almost equal mortality reported at the community level among men (36) and women (39).

DISCUSSION

The decline in malaria cases and deaths can be attributed to Rwanda's robust control measures, including LLINs, IRS, and community-based management [3]. However, the persistence of hotspots in the southern region and around Kigali may reflect challenges in intervention coverage or emerging mosquito resistance to insecticides. The higher incidence of malaria in children under five in the southern region and areas around Kigali is also consistent with global trends where children in endemic regions remain disproportionately affected due to underdeveloped immunity [2]. However, the observed 45% reduction in cases

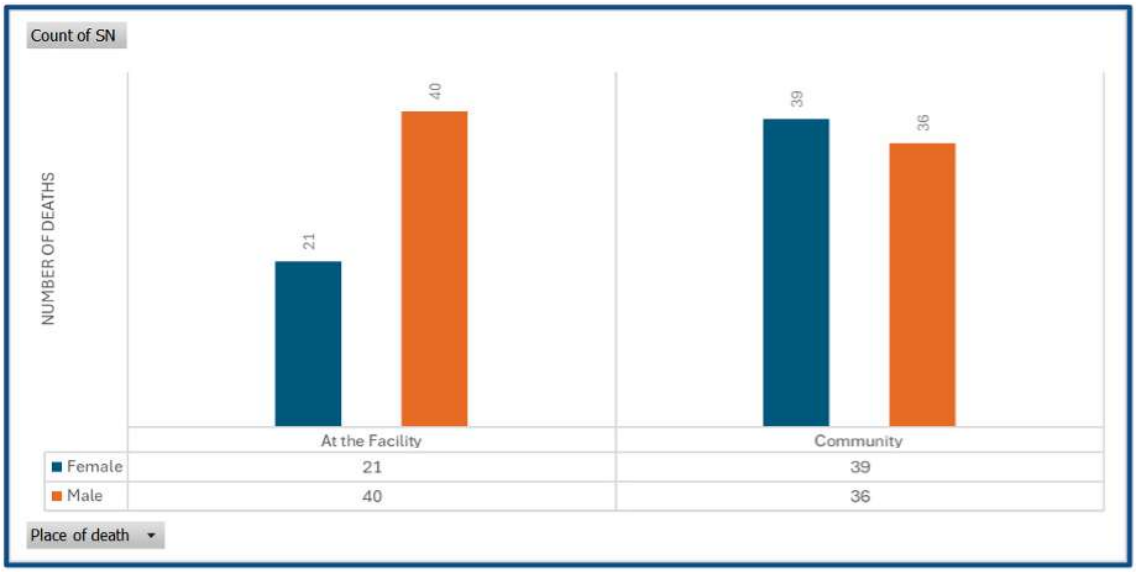


Figure 4: *Figure 4. Rwanda 2023 malaria deaths by gender and reporting type*

from 2021 to 2022 underscores the success of Rwanda's targeted interventions, such as LLINs and IRS, which have been shown to significantly reduce transmission in similar settings [3]. The geographic variation in cases, particularly the higher rates in the southern region, may reflect ecological factors like elevation and rainfall, which influence mosquito breeding [5,6]. This aligns with other studies emphasizing the role of environmental determinants in malaria transmission [7,8]. The heterogeneous year-to-year trends in 2021 and 2022 in malaria infection among children under five suggest localized variations in intervention coverage, vector ecology, and environmental factors. Increases in Gasabo, Nyarugenge, and Gicumbi may reflect urban breeding sites micro-climate differences, or population mobility, while declines in Ruhango, Bugesera, and Gisagara likely reflect stronger intervention coverage through LLINs and IRS. Environmental and socioeconomic heterogeneity influence these outcomes [2,7,8].

The report reveals a concerning disparity in malaria mortality among the elderly, who accounted for 21% of deaths despite representing only 3% of the population. This contrasts with the global focus on under-five mortality and suggests a gap in addressing malaria in older populations. Literature indicates that aging populations in endemic regions may face increased susceptibility due to comorbidities and declining immunity [9,10]. The findings call for tailored interventions for this demographic, an area often underrepresented in malaria control strategies.

Another critical finding is the gender disparity among elderly population in facility-reported malaria deaths, with females less likely to be recorded than males compared to the community-based reporting. This discrepancy may stem from sociocultural factors, such as healthcare-seeking behavior, where women may prioritize care for children over themselves. Alternatively, systemic biases in data recording or access to healthcare for women could contribute, as noted in studies from similar contexts [11].

Limitations: Mortality data completeness remains challenging, which may affect the accuracy of mortality estimates. Additionally, the analysis relied on facility-based reporting, potentially underestimating community deaths, particularly among women and rural populations. Future studies should incorporate community surveys to capture unreported cases and deaths.

RECOMMENDATIONS

Rwanda's overall malaria infection rate in the last decade has decreased dramatically and thus deaths have followed that pattern as well. With smaller numbers of cases in the country, there can be a transition from broad to targeted interventions. Looking at differences in malaria among vulnerable populations becomes increasingly valuable. Higher rates of infection in children under 5 in the southern region of Rwanda and areas around Kigali demonstrate a need for more resources to prevent malaria infection. LLINs and IRS interventions should be increased in these areas while maintaining current levels in the rest of the country. A review of facility deaths for malaria should confirm the difference in mortality by gender. An assessment of where women are dying and if there are reporting differences by gender could aid in determining the root cause of reporting variation. A study on how to increase awareness on the impact of Malaria in the elderly +65 population may prevent deaths in the age group.

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Rwanda
Public Health Bulletin

About the Rwanda Public Health Bulletin (RPHB)

The Rwanda Public Health Bulletin (RPHB) is a printed and open access, peer-reviewed journal, published as the flagship scientific and technical periodical publication. RPHB is a public health bulletin launched in March 2019 by the Rwandan Ministry of Health, through the Rwanda Biomedical Centre (RBC) in collaboration with the CDC Foundation and with support from Bloomberg Philanthropies Data for Health Initiative.

Mission

To serve as a scientific information dissemination platform of national and international significance, mainly in areas related to the Rwanda Ministry of Health's essential mission to strengthen national and local health systems and improve the health of the people of Rwanda. The Rwanda Public Health Bulletin publishes disease surveillance summaries, public health response guidelines, public health notices, case reports, outbreak reports, original research papers, and policy briefs among others. It generally features issues of importance to its targeted audience, which is health professionals, academic researchers, policymakers and anybody interested in health issues. Articles for publication are received from doctors, nurses, allied health professionals, students, policymakers, government bodies, non-governmental bodies and others.

Aim

To bridge the gap in public health information sharing between policymakers, researchers, health professionals and practitioners.

Publisher

RPHB is a publication of the Rwanda Health Communication Centre (RHCC) which is the communication arm of the Rwanda Ministry of Health and operating under the Rwanda Biomedical Centre (RBC).

Registration

Online ISSN: 2663 - 4651, Print ISSN: 2663 - 4643

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INSTRUCTIONS TO AUTHORS

All works submitted to this bulletin will have to belong to the types of articles stated below:

1. ORIGINAL RESEARCH

Referred to as "Primary Research" pioneer in a determined domain. It can be from various aspects: Clinical features, pathophysiology, biochemistry, molecular biology, etc.

THE TITLE

The title of the article should be concise and informative. It should contain enough thoughts on the subject.

ABSTRACT

Abstract of 250 words maximum must accompany each manuscript and be divided into 4 paragraphs with the following headings and MeSH keywords:

Introduction: stating the purposes/aims of the work; the research undertaken, the hypothesis tested or the procedure evaluated.
Materials and methods: briefly stating what was done and what materials were used, including the number of subjects, the methods to assess the data and to control bias.
Results: Providing key findings of the study, including indicators of statistical significance, actual numbers, as well as percentages.
Conclusion: Summarizing in 1 or 2 sentences the work on the basis of the findings. It emphasizes new and important aspects of the study or observations.

THE MAIN TEXT

The text of observational and experimental articles is divided into sections with the following headings: Introduction: should always begin the text, and requires brevity and focuses. It conveys the nature and purpose of the work, and quotes the relevant literature. Only strictly pertinent background information is necessary for understanding why the topic is important. We suggest the final paragraph clearly states the hypothesis or purpose of the study.

METHODS

Details of clinical and technical procedures should follow the introduction. A clear description of the selection of the observational or experimental subjects should be given. The identification of all aspects of the study, its reasoning, and the related relevance should be explicitly justified. In case, the study was done in a particular way, the guiding principles should all be clarified. Exclusion and inclusion criteria or partial inclusion, the reliability index, the confidentiality index, the analysis step, and the data collection processes should be also carefully specified. This section should provide sufficient details on the methods, instrumentation, procedures, all drugs and chemicals used (including generic names, doses, routes of administration). It should allow other workers to reproduce the study if necessary.
This section should also state the self-evaluation of the study by: independent/consensus readings blinded or unblinded to other information and estimate the fluctuation of recall biases by random ordering of studies.

Be clear about the retrospective or prospective nature of the study. Finally, provide references to established methods, including statistical methods that have been published, forthcoming, or that may not be well known. New description or substantially modified methods may be used however, give reasons for the use of these techniques, and evaluate their limitations. Statistical methods should be described with enough details to enable a knowledgeable reader with access to the original data to verify the reported results. A general description of methods would be defined in the methods section, whereas a specific statistical method used into analysis would be summarized in the results section. Any general use of the computer program should be

specified, and more details have to be clarified about any randomization issues.

RESULTS

Logical sequence of presentation of results is required in the text; along with tables, and illustrations. Repetition of data from illustrations into the text should be avoided; however, emphasize or summary of only important observations would be helpful. Avoid the ‘’non-technical use’’ of technical terms in statistics which should be defined and reserved for the right purpose. Moreover, define all those statistical terms aside with or including abbreviations and/or most used symbols. Any complication and/or unexpected finding should be reported and the more possibly explained and the author should report lost to follow up and dropouts from a clinical trial.

DISCUSSION

Use ample subheadings. Emphasize the new and important aspects of the study and the conclusions that follow from them. Avoid repetition of details included in other parts. This section requires the mention of the implication of the findings, and their limitations for future research, involving relating the observations to other relevant studies.

Finally, the conclusions should be linked to the goals of the study; though mostly avoiding:

Unqualified statement not completely supported by the data

Statement on economic benefits and costs unless the report includes economic data and analyses

Claim of priority and alluding to work that has not been completed.

Whereas new hypotheses could be suggested when warranted, but they should be clearly labeled as such and recommendations, when appropriate and needed, may be given.

Acknowledgments

List all contributors who do not meet the criteria of authorship, such as those who provided purely technical help, writing assistance, or a department chair who provided only general support; and their respective contribution will be headed as provided. Everybody must have given written permission to be acknowledged. References: References should be numbered consecutively in the order in which they were first mentioned in the text. They will be identified in the text, tables, and legends by arabic numbers. This bulletin uses the IEEE style (Institute of Electrical and Electronics Engineers) for referencing the citations. It is advised to avoid citations or personal communication unless they provide essential and pertinent information. In all case, the name of the person and date of communication should be cited in parentheses in the text.

2. CHECKLIST FOR SURVEILLANCE REPORTS

Disease surveillance summaries are reported following the checklist below:
Title: Compose a title that includes the name of the health condition, population, time and place.
Abstract: Provide a structured abstract including the following sub- headings: Background; Objectives; Methods; Results; and Conclusion.

INTRODUCTION

Context: Summarize the current situation regarding the health condition under surveillance and identify why it is important. Objectives: State the objective of the surveillance report.

METHODS

Setting: Describe the setting, locations and dates of the surveillance period.
Population: Describe the population under surveillance. Definitions: Provide definitions for each health event under surveillance, including

case definitions and any public health interventions. **Information sources**: Describe all data sources, including the objective of any surveillance systems, what data were collected and how data were gathered, transferred and stored. Supplementary data: If appropriate, note where to access supplemental material (e.g., www.opendata.gc.ca). **Data quality, missing data and reporting delays:** Describe how the data quality was assessed. Explain how missing data were addressed. If data is reported by date of diagnosis or symptom onset, include a statement about whether the data for the most recent periods may be revised.

DATA ANALYSIS

Describe any analytical methods used providing sufficient detail to enable a knowledgeable reader with access to the original data to judge its appropriateness and to assess the reported results.

RESULTS

Descriptive: Provide a summary of the descriptive data, including demographics.
Data Quality: Report on data quality (e.g., completeness, missing data, under reporting)
Analytic data: Provide a summary of the analysis including (when indicated) estimates of trends. When applicable, point estimates should include appropriate indicators of measurement error such as 95% confidence intervals (e.g., average annual percentage change used to describe trends or odds ratios used to describe subgroup differences).
Figures: Create the minimum number of figures to highlight key results. Create a title that includes person, time and place.

DISCUSSION

Key results: Summarize key results with reference to study objectives
Comparison: Consider these findings in relation to the current literature. Strengths and weaknesses: Discuss the strengths and weaknesses of the study (data quality, completeness, sources of potential bias). Interpretation and generalizability: Provide a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies and other relevant evidence.
Conclusion: Ensure conclusions address objectives and follow from the results.

3. PUBLIC HEALTH NOTICES / OUTBREAK REPORTS

Following the Center for Disease Control recommendations, for public heath notices and outbreak reports to be published they need to cover all four components as stated below:

INTRODUCTION

Generally, the introductory paragraph should begin with 1 to 3 sentences establishing the existence of the outbreak or underlying public health problem. E.g., "On January 2, 2008, the Nevada State Health Division contacted CDC concerning surveillance reports received regarding two persons recently diagnosed with acute hepatitis C." The introductory paragraph also usually contains: a) a statement that an investigation was conducted, when and by whom; b) the most important finding(s); c) the actions taken to stem the outbreak; and d) a statement of the public health implications and actions that should be taken in response to the investigation. Investigation and results: First, present the initial investigation and its findings. This might include: 1) a description of the setting and a statement of how the outbreak came to the attention of health authorities; 2) a clinical description of the index case or initial cases; 3) initial key test results; and 4) hypothesis generation activities and results. Next, summarize the full investigation, including: case definition, case-finding activities, method of investigation, and results. Cases should be counted and described by clinical characteristics, treatment, and outcome, as well as time, place, and person descriptive results. Next, present the methods and results of any analytic epidemiologic studies (e.g.,

cohort or case-control studies). Finally, provide the results of any relevant microbiologic, genetic, or toxicologic results, followed by the results of any testing of environmental samples. Public health response: When appropriate, a brief description summarizing any public health interventions taken and the results of the interventions follows.

DISCUSSION

Same as for a Full Report, except that a Limitations paragraph might not be required for an Outbreak Report.

4. POLICY BRIEFS

This bulletin will use guidelines on reporting/ publishing policy notes as they are suggested by the Center for Disease Control (CDC). As the CDC defines them; Policy Notes are intended to announce new official policies or recommendations (e.g., from ACIP or CDC). These reports can be thought of as briefs. Maximum word count at submission is 1,400 words. Up to three tables, figures, or boxes may be included. Policy Notes contain no Discussion or Limitations, and a summary box is not required. Although policy notes or brief might vary, following is a rough guide of what basic notes should have: Introduction: The introductory paragraph should be limited to 150–200 words. It might contain all or some of the following components: a brief introductory statement orienting the reader to the topic and placing it in context, a brief description of the public health problem, a brief statement of the rationale for the policy or recommendation, mention of the most important parts of the policy or recommendations, and one or two sentences stating the conclusions and the public health implications of the new policy or recommendations.

BACKGROUND

The Policy Note should include a paragraph after the introduction that summarizes background information relevant to the policy or recommendation that can help the reader understand the context and need for the policy or recommendation.

Methods: Should include a summary of the methods used to establish the policy or recommendation, including answers to some or all of these questions: Who was involved in the production of the guidelines or recommendations, and how? What evidence base was considered? What was the rationale for considering this evidence base? Was other evidence excluded from consideration and, if so, why? Rationale and evidence: The Policy Note should provide a concise review of the rationale for the policy or recommendation and a descriptive review of the scientific evidence used to establish it. It should include an explanation of how the policy or recommendation adds to, or differs from, relevant policies or recommendations established previously. Presentation of the policy or recommendation: The policy or recommendation should state clearly when it takes effect and to whom and under what circumstances it applies.

DISCUSSION OR COMMENT

The Policy Note should comment on the likely impact of the new policy or recommendation and plans for assessment of the policy or recommendation

5. CASE REPORTS

These are reports of an individual patient on their symptoms, treatment reactions on a disease or condition of interest. These reports normally focus on unusual reactions or occurrences. Similar cases to other research reports, case reports might include a literature review of previous similar. Case reports might also address positive patient outcome on particular treatment guidelines or individual impact of a particular intervention. These are mainly used for educational and decision-making purposes. Case reports are normally reported following a checklist found at the CARE Guidelines.

6. CASE STUDIES

We recommend authors to follow the "EQUATOR Network" for ample explanations and guidelines in the writing of such articles. They have to be well-described case studies on health care interventions of public health concern. These could be:

Rigorous assessments of processes and program interventions.

Recommendations on possible health interventions.

Never on individual patient (= case report)

7. COMMENTARIES / OPINION / METHODOLOGY ARTICLES

We recommend authors to follow the "EQUATOR Network" for ample explanations and guidelines in the writing of such articles. Though these articles are moderated, they should be:

Short, focused, opinionated to previous articles or any subject related to the journal entirely. Contemporary and focusing on specific issues. Normally up to 800 words.

Frank critics to the journal are bravely motivated and would be as much as possible published.

8. FORMATTING THE MANUSCRIPT

Please note that articles which are not correctly formatted will be returned to the authors

Format text: Style: No Spacing, Single column, Single Spacing
Font: Single Spacing, Times New Roman - size 12
Titles: Capitals and bold, size 14
Format tables: Times New Roman, Font size 9 No vertical lines. Horizontal lines in the table can be removed. No table should be larger than a single A4 page. Footnote should be size 9 and italic

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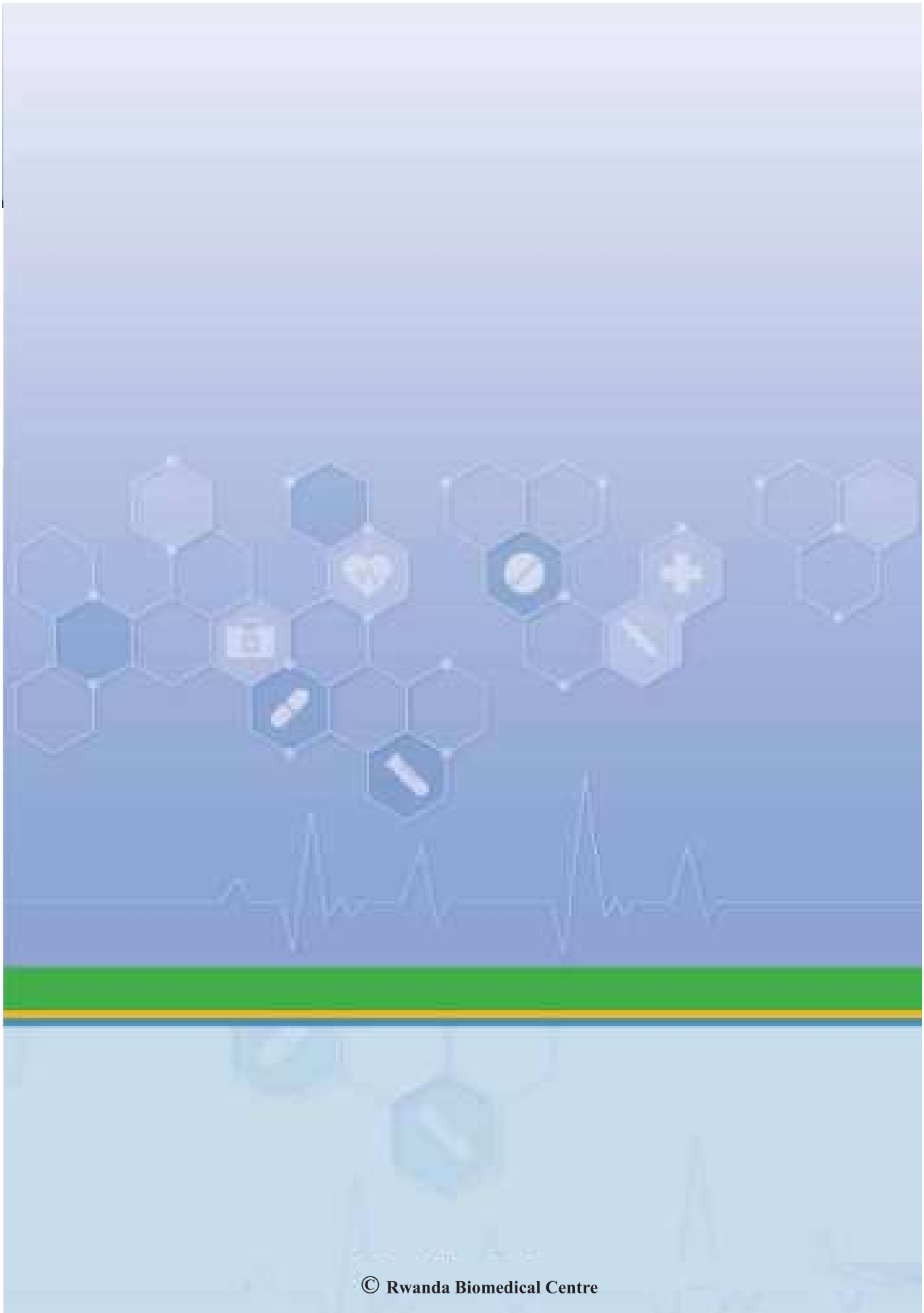
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